REMARKS

Introduction

Applicants would like to thank the Examiner for reopening prosecution in light of the appeal brief filed on March 29, 2010.

Claims 1-3, 5-21, and 23 are pending in the present application. In this Response, claims 1, 6, 10, 18, and 23 have been amended for clarity. See, for example, page 8, line 9; page 10, line 4; and page 13, lines 15-16 of the present specification for exemplary support. No new matter has been added.

Applicants respectfully request the Examiner to reconsider and withdraw the outstanding rejections in view of the following remarks.

Claim Objection

Claim 1 has been objected to because the term "salts" has been misspelled as "sals". As required by the Examiner, claim 1 has been amended to replace "sals" with "salts". Accordingly, the objection to claim 1 should be withdrawn.

Obviousness-type Double Patenting

Claims 1-3, 5-21, and 23 have been provisionally rejected under the judicially created doctrine of obviousness-type double patenting as allegedly unpatentable over claims 1, 9, and 12-20 of U.S. Patent Application No. 10/523,302, which issued as U.S. Patent 7,455,997 (hereinafter "the '997 patent") on November 25, 2008.

Applicants believe that the present claims are patentable over the claims of the '997 patent. However, to facilitate allowable subject matter, a terminal disclaimer over the '997 patent will be submitted under separate cover, as appropriate, once allowable subject matter has been agreed upon.

It should be noted that the filing of a terminal disclaimer to obviate a rejection based on nonstatutory double patenting is not an admission of the propriety of the rejection. *Quad Environmental Technologies Corp. v. Union Sanitary District*, 946 F.2d 870, 20 USPQ2d 1392 (Fed. Cir. 1991).

Rejection under 35 U.S.C. § 102

Claims 1, 2, 5, 17, 18, 20, 21, and 23 have been rejected under 35 U.S.C. § 102(e) as allegedly anticipated by U.S. Patent No. 7,566,469 (hereinafter "Scheimann"). This rejection is respectfully traversed.

Legal Standard

Initially, it should be noted that a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). It should further be noted that unless a reference discloses within the four corners of the document not only all of the limitations claimed but also all of the limitations arranged or combined in the same way as recited in the claim, it cannot be said to prove prior invention of the thing claimed and, thus, cannot anticipate under 35 USC 102. *Net Moneyin, Inc. v. Verisign, Inc.*, 545 F.3d 1359, 88 U.S.P.Q.2d 1751 (Fed. Cir. Oct. 20, 2008).

Present Claims

Independent claim 1, from which rejected claims 2, 5, 17, 18, 20, 21, and 23 directly or indirectly depend, recites a process of separating suspended solids from a fermentation liquor by subjecting the liquor to a solids-liquid separation stage, wherein the fermentation liquor is produced in a fermentation process for the production of a fermentation product, in which the fermentation liquor has been subjected to a temperature of at least 50°C, wherein the solids-liquid separation stage is assisted by a treatment system, characterized in that the treatment system comprises an anionic polymer selected from natural polymers and modified natural polymers having an anionic charge such that the equivalent weight is below 300, and synthetic polymers formed from at least 50% by weight anionic monomer units which anionic monomer units are selected from the group consisting of (meth) acrylic acids or salts, maleic acid or salts, itaconic acid or salts and fumaric acid or salts.

Cited Art

Scheimann is directed to a method of dewatering corn stillage solids comprising

adding to the solids an effective coagulating and flocculating amount of an anionic copolymer comprising acrylic acid sodium salt, methacrylic acid sodium salt or 2-acrylamido-2-methyl-1-propanesulfonic acid sodium salt to form a mixture of water and coagulated and flocculated solids; and separating the water from the coagulated and flocculated solids using a dewatering device. (Abstract).

Differences between Pending Claims and Cited Art

It is the Examiner's position that "Scheimann discloses...the liquor has been subjected to a temperature of at least 50°C..." (Office Action dated June 25, 2010, Pages 5-6). However, no particular portion of Scheimann has been cited in the Office Action in support for the foregoing position.

It is respectfully submitted that Scheimann does not disclose or suggest a fermentation liquor that has been subjected to a temperature of at least 50°C which is then treated with an anionic polymer, as recited in independent claim 1.

At only one point in Scheimann is it generally discussed that a stillage stream is heat treated. However, Scheimann discloses that the stillage stream is first treated with an acrylamide/sodium acrylate copolymer and then a sample of the stillage stream is placed in a 105°C oven for 24 hours. (Example 3). Accordingly, even the closest discussion in Scheimann teaches treatment of the stillage stream with an anionic polymer and *then* heating a sample of the stillage stream. Scheimann's teaching is not the same as or similar to the recitation in claim 1 which provides heating of the fermentation liquor (not just a sample) and *then* treating the liquor with an anionic polymer.

A fermentation liquor in the art could be subjected to a wide range of temperatures at any treatment stage. However, Scheimann, which has been relied upon as anticipatory art, does not disclose or suggest a fermentation liquor that has been subjected to a temperature of at least 50°C which is then treated with an anionic polymer, as recited in independent claim 1.

If it is the Examiner's position that Scheimann inherently discloses or suggests subjecting fermentation liquor to a temperature of at least 50°C which is then treated with an anionic polymer, the Examiner's attention is respectfully directed to M.P.E.P. § 2112, wherein it is provided that the fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993).

Moreover, M.P.E.P. § 2112 further provides that inherency may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient. *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999).

Accordingly, clarification of the record is requested with regard to the Examiner's position that "Scheimann discloses...the liquor has been subjected to a temperature of at least 50°C..." (Office Action dated June 25, 2010, Pages 5-6).

Nonetheless, it is respectfully submitted that Scheimann does not disclose or suggest a fermentation liquor that has been subjected to a temperature of at least 50°C which is then treated with an anionic polymer, as recited in independent claim 1.

In view of at least the above, the rejection over Scheimann should be withdrawn.

Rejections under 35 U.S.C. § 103

Legal Standard

Initially, it should be noted that the Office has the initial burden of establishing a factual basis to support the legal conclusion of obviousness. *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). For rejections under 35 U.S.C. § 103(a) based upon a combination of prior art elements, in *KSR Int'l v. Teleflex Inc.*, 127 S.Ct. 1727, 1741, 82 USPQ2d 1385, 1396 (2007), the Supreme Court stated that a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006).

Present Claims

Independent claim 1, from which rejected claims 2, 3, 5-21, and 23 directly or indirectly depend, recites a process of separating suspended solids from a fermentation liquor by subjecting the liquor to a solids-liquid separation stage, wherein the fermentation liquor is produced in a fermentation process for the production of a fermentation product, in which the fermentation liquor has been subjected to a temperature of at least 50°C, wherein the solids-

liquid separation stage is assisted by a treatment system, characterized in that the treatment system comprises an anionic polymer selected from natural polymers and modified natural polymers having an anionic charge such that the equivalent weight is below 300, and synthetic polymers formed from at least 50% by weight anionic monomer units which anionic monomer units are selected from the group consisting of (meth) acrylic acids or salts, maleic acid or salts, itaconic acid or salts and fumaric acid or salts.

(i) Claims 1-3, 5, 10, 17-21, and 23 have been rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Scheimann in view of Wall et al., Effect of Recycling Distillers' Solubles on Alcohol and Feed Production from Corn Fermentation, Journal of Agriculture Food Chemistry, 31(4)1983:770-775 (hereinafter "Wall"). The rejection is respectfully traversed.

Cited Art

As provided hereinabove, Scheimann is directed to a method of dewatering corn stillage solids comprising adding to the solids an effective coagulating and flocculating amount of an anionic copolymer comprising acrylic acid sodium salt, methacrylic acid sodium salt or 2-acrylamido-2-methyl-1-propanesulfonic acid sodium salt to form a mixture of water and coagulated and flocculated solids; and separating the water from the coagulated and flocculated solids using a dewatering device. (Abstract).

Wall is directed to recycling separated aqueous solubles and using the recycled separated aqueous soluble for mashing and fermenting the grain without impairing fermentation. (Abstract).

Differences between Pending Claims and Cited Art

The discussion hereinabove regarding the differences between the pending claims and Scheimann is herein incorporated by reference.

As explained in detail hereinabove, Scheimann does not disclose or suggest a fermentation liquor that has been subjected to a temperature of at least 50°C which is then treated with an anionic polymer, as recited in independent claim 1.

While Wall generally discusses the benefits of recycling, Wall is not directed to a process of separating suspended solids from a fermentation liquor by subjecting the liquor,

which has been subjected to a temperature of at least 50°C, to a solids-liquid separation stage, which is assisted by a treatment system, characterized in that the treatment system comprises an anionic polymer, as recited in independent claim 1.

More particularly, Wall fails to cure Scheimann's deficiencies. Wall, like Scheimann, fails to disclose or suggest a fermentation liquor that has been subjected to a temperature of at least 50°C which is then treated with an anionic polymer, as recited in independent claim 1.

Further, there is no reason one of skill in the art would turn to Wall after reading Scheimann because Wall generally relates to the benefits of recycling distillers' soluble whereas Scheimann relates to a method of dewatering corn stillage solids comprising adding to the solids an effective coagulating and flocculating amount of an anionic copolymer.

In light of the dissimilar technical focuses of Scheimann and Wall, it appears that Scheimann and Wall have been combined using impermissible hindsight. In this regard, it should be noted that M.P.E.P. § 2142 sets forth that impermissible hindsight must be avoided.

In view of at least the above, Scheimann and Wall, either in combination or alone, do not disclose or suggest a fermentation liquor that has been subjected to a temperature of at least 50°C which is then treated with an anionic polymer, as recited in independent claim 1.

As Scheimann and Wall fail to disclose or suggest a fermentation liquor that has been subjected to a temperature of at least 50°C which is then treated with an anionic polymer, as recited in independent claim 1, Scheimann and Wall, either alone or in combination, also fail to recognize the advantages resulting from the foregoing recited features. In particular, an advantage of the foregoing features is that the yield and/or efficiency of the present process can be improved by effecting a rapid but efficient solids-liquid separation of the solid residues from a fermentation liquor that has been subjected to elevated temperatures (*i.e.*, at least 50°C). (See, for example, page 6, lines 4-15 of the present specification).

Accordingly, the rejection over Scheimann and Wall should be withdrawn.

(ii) Claims 1, 2, 5-9, 11-18, 20, 21, and 23 have been rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Scheimann in view of U.S. Patent No. 6,132,625 (hereinafter "Moffett") and further in view of U.S. Publication No. 2003/0155091 (hereinafter "Coffey") and Ovenden et al., Colloids and surfaces A: Physicochemical and Engineering Aspects, Vol. 197, p. 225-234 (2002) (hereinafter "Ovenden"). The rejection is respectfully traversed.

Cited Art

As provided hereinabove, Scheimann is directed to a method of dewatering corn stillage solids comprising adding to the solids an effective coagulating and flocculating amount of an anionic copolymer comprising acrylic acid sodium salt, methacrylic acid sodium salt or 2-acrylamido-2-methyl-1-propanesulfonic acid sodium salt to form a mixture of water and coagulated and flocculated solids; and separating the water from the coagulated and flocculated solids using a dewatering device. (Abstract).

Moffett is directed to a process of separating biosolids from an aqueous stream resulting from animal or vegetable processing operations using as flocculants an anionic inorganic colloid and a cationic polymer having a molecular weight greater than 1,000,000. (Col. 2, lines 7-15).

Coffey is directed to high molecular weight, charged polymers effective for flocculating aqueous suspensions. (Page 1, paragraph [0009]).

Ovenden is directed to studying flocculation systems involving anionic microparticles/cationic polymers. (Abstract).

Differences between Pending Claims and Cited Art

The discussion hereinabove regarding the differences between the pending claims and Scheimann is herein incorporated by reference.

As explained hereinabove, Scheimann does not disclose or suggest a fermentation liquor that has been subjected to a temperature of at least 50°C which is then treated with an anionic polymer, as recited in independent claim 1.

While Moffett, Coffey, and Ovenden generally discuss flocculation using anionic and cationic polymers and/or particles, Moffett, Coffey, and Ovenden, alone or in combination, are not directed to a process of separating suspended solids from a fermentation liquor by subjecting the liquor, which has been subjected to a temperature of at least 50°C, to a solids-liquid separation stage, which is assisted by a treatment system, characterized in that the treatment system comprises an anionic polymer, as recited in independent claim 1.

More particularly, Moffett, Coffey, and Ovenden fail to cure Scheimann's deficiencies. Moffett, Coffey, and Ovenden, like Scheimann, fail to disclose or suggest a fermentation liquor that has been subjected to a temperature of at least 50°C which is then treated with an anionic polymer, as recited in independent claim 1.

In view of at least the above, Scheimann, Moffett, Coffey, and Ovenden, alone or in combination, do not disclose or suggest a fermentation liquor that has been subjected to a temperature of at least 50°C which is then treated with an anionic polymer, as recited in independent claim 1.

As Scheimann, Moffett, Coffey, and Ovenden, alone or in combination, fail to disclose or suggest a fermentation liquor that has been subjected to a temperature of at least 50°C which is then treated with an anionic polymer, as recited in independent claim 1, Scheimann, Moffett, Coffey, and Ovenden, alone or in combination, also fail to recognize the advantages resulting from the foregoing recited features. In particular, an advantage of the foregoing features is that the yield and/or efficiency of the present process can be improved by effecting a rapid but efficient solids-liquid separation of the solid residues from a fermentation liquor that has been subjected to elevated temperatures (*i.e.*, at least 50°C). (See, for example, page 6, lines 4-15 of the present specification).

Further, with regard to Moffett, it should be noted that a combination of anionic *inorganic* colloids are used in combination with organic polymers to clarify aqueous streams. (Col. 2, lines 7-15). In contrast, independent claim 1 recites an anionic *polymer* to assist in separating suspended solids from a fermentation liquor. There is no reason why one of skill in the art would substitute the presently recited anionic polymers with the anionic *inorganic* colloids of Moffett.

With regard to Coffey, there would be no motivation for one of skill in the art to rely upon the discussion of Coffey when considering the present claims because Coffey is directed to cellulosic suspensions in papermaking. It should be noted that a papermaking slurry is generally less than 1 percent dry weight of the solids in the slurry and the solids are primarily cellulosic. (Page 1, paragraph [0002]; see also page 7, paragraph [0083]). In contrast, a fermentation liquor contains biomass derived from materials containing hemicelluloses and lignocellulosic compounds (*i.e.*, lignin and lignin-type substances) or alternatively derived from purer carbohydrate substrates such as sugars derived from crops producing starch. (Page 6, lines 21-26 of the present specification). The dry matter weight percent of the fermentation liquor is in the range of 7%, which is a far greater concentration than that for cellulosic slurries for making paper. (Example 1: page 15, lines 23-24 of the present specification).

With regard to Ovenden, the Examiner appears to have primarily relied upon this reference to establish motivation to establish proper combination of the other references. (Office Action dated June 25, 2010, Page 11). In particular, Ovenden has been relied upon to establish that "a person of ordinary skill in the art at the time the invention was made would have realized that the dose, the type of the polymers and the charge density and the intrinsic viscosity of the polymer used in a solid-liquid separation system could have been optimized using the known methods". (Office Action dated June 25, 2010, Page 11). In order to establish the foregoing, the Examiner has cited to page 226 of Ovenden. In this regard, it should be noted that while Ovenden does disclose that "...reliable selection of a suitable flocculation system largely depends on the chemistry of the system and the fundamental understanding of the floc structures and flocculation mechanisms" (relied in-part by the Examiner at Page 11 of the Office Action dated June 25, 2010), Ovenden goes on to disclose in the next sentence that "...to reveal the flocculation mechanism for the current systems is also one of important goals of our research...main objectives of this work were...1. ... 2. ... 3. ... 4. to explore the flocculation mechanisms involved." (Page 226). Thus, if anything, Ovenden provides that it is in fact difficult (*i.e.*, unpredictable) to determine the flocculation mechanism for the limited combinations of anionic microparticles and cationic polymers of Ovenden. Moreover, Ovenden indeed "explores" the flocculation mechanism for the limited combinations of anionic microparticles and cationic polymers in pages 226-234. Accordingly, Ovenden actually teaches that a person of ordinary skill in the art would ***not*** have been able to optimize the dose, the type of the polymers, the charge density, and the intrinsic viscosity of the polymers used in a solid-liquid separation system using known methods.

In view of at least the above, the rejection over Scheimann, Moffett, Coffey, and Ovenden should be withdrawn.

Conclusion

The Examiner is invited to contact Applicants' undersigned representative at the telephone number listed below if any issues remain in this matter, or if a discussion regarding any portion of the application is desired by the Examiner.

Respectfully submitted,

Law Office of Shruti Costales, PLLC

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